DOCUMENT RESUME

ED 261 611 HE 018 709

AUTHOR Kaneko, Motohisa
TITLE Growth Expectation and Aggregate Demand for Higher Education. The Japanese Case.
PUB DATE Apr 85
NOTE 11p.; Paper presented at the Annual Meeting of the American Educational Research Association (69th, Chicago, IL, March 31-April 4, 1985).
PUB TYPE Viewpoints (120) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *College Attendance; *Economic Factors; *Educational Benefits; *Educational Demand; Education Work Relationship; Enrollment Influences; Foreign Countries; Higher Education; *Labor Market; Models; *Salaries
IDENTIFIERS *Japan

ABSTRACT

Changes in the demand for higher education in postwar Japan are analyzed. Three simple conceptual models of the anticipated benefit of education are considered, along with the validity of each model in explaining changes in aggregate demand for college. A classical model assumes that individuals know about the prevailing wage structure and expect it to stay unchanged. A perception bias (lag) model posits that individuals anticipate the benefit of education according to wage structure perceptions, which are biased or lagged images of the present and past structure. The shift expectation model integrates the factor of expectation of future shift in wage structure. To test the validity of each model, alternative sets of time-series indices of anticipated benefit of higher education were estimated from wage structure statistics. A theoretical model of individual choice about education was also developed, and the aggregate demand function of education was derived. Shift expectation was found to be a significant factor in the formation of anticipated benefit of education, and thus in determining the changes in the demand for education. The effect of an economic cycle on educational demand is also considered, with attention to changing family income, changing wage structure, and the formation of future growth expectations. (SW)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED261611

Growth Expectation and Aggregate Demand for Higher Education

The Japanese Case

Motohisa Kaneko

State University of New York at Albany

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

This document has been reproduced as received from the person or organization originating it.

Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Motohisa Kaneko

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

A Paper Presented at
1985 American Educational Research Association Meeting
March 31 - April 4, Chicago, Illinois

BEST COPY AVAILABLE

HE018009

「可行已信，而不見其形，有情無形」

『莊子』齊物論篇 第二

The result of function is conceivable; and yet, one can not observe the function itself. That is, the process exists, but it does not have a form.

Tsuang Zu (4C.,B.C.), The Chapter of Things of Equal Forms, Section 2.

It was the beginning of the 1960s that the theoretical foundation of economic analysis of education was laid out by the "Human Capital Revolution." The concept of rate of return was applied to the investment on human capital to measure the profitability of such investment to the society as a whole and to each individual making the investment. While the social rate of return provided the basis of normative judgement for educational policies, the private rate of return would become the core of empirical analyses about the demand for educational opportunitines. In the subsequent years, human capital theory established itself in the economic theory, but the progress towards the better understanding of the demand for education has been surprisingly modest until recently. For the students of education the revolution has thus not been completed.

The stumbling block of theoretical analysis was this: it is logically clear that the individual choice about education, which is the basis of the aggregate demand for educational opportunities, is to a large extent based on the magnitude of the benefit of education that the individual anticipates to receive in the future, but exactly how much benefit he is anticipating is not directly observable. The anticipated benefit may be closely related with the rate of return directly estimated from a current wage structure (we may call it the "classical rate of return) but it is not necessarily the same as the latter. Thus an analytical inquiry into the process of formation of anticipated benefit of education becomes the key to further development of systematic analysis of the demand for education.

In this paper, I will set forth simple conceptual models of anticipated benefit of education integrating the prevailing wage structure, perception bias thereof and rational expectation of structural shifts in wage structure. The validity of each model is tested by examining how it contributes to explain the actual changes in aggregate demand for college education in postwar Japan. From the results, it will be argued that the shift expectation was in fact a significant factor in the

formation of anticipated benefit of education, and thus in determining the changes in the demand for education in the long run.

1. Anticipated Benefit of Education

As the framework of the entire discussion, conceptual models of anticipated benefit of education are developed in this section.

Consider a typical individual who is about to make a decision on whether he should go to college or not. He will evaluate the monetary benefit of college education by assessing the differences between the wage that he would receive after graduating from a college and that he would receive after entering the labor market as a high school graduate. Economic theories teach us that the wage differentials in the future should be discounted and that the loss of potential earnings during college education (foregone earnings) ought to be counted as a cost. Those considerations are important to define the benefit precisely, but besides the point that we are addressing. The issue is rather how he anticipates the differences in wage that he will obtain in particular time periods in future. We shall consider a simple model of anticipation that is most straight-forward from the view-point of economics, and then proceed to develop more complicated, and probably more realistic models, by integrating some subjective factors that are presumably involved in the process of anticipation.

(i) The Classical Model

A simplest model, which we call the "Classical Model," assumes that the typical individual have the exact knowledge of the prevailing wage structure in the current labor market and that he anticipates it would stay unchanged in the future. An eighteen-years-old in 1985 is therefore supposed to know precisely how much more college graduates are earning than high-school graduates at the age of forty, and to anticipate that he will get the same amount of difference when he would become age forty in 2007. This is the implicit assumption of the text-book definition of internal rate of return.

(ii) Perception Bias (Lag) Model

One significant source of the criticism to the Classical Model is that it does not take into account the potential imperfection of information. For various reasons, the knowledge of an individual about the present wage structure may be biased. Also, when the wage structure has been changing rapidly, his knowledge may be somewhat lagged. Hence the second model that we consider incorporates the bias or lag involved in the perception of wage structure,

BEST COPY AVAILABLE

and accordingly called the "Perception Bias (Lag) Model." In this model, a typical individual anticipates the benefit of education according to his perception of the wage structure which is a biased or lagged image of the present and past real wage structure.

(iii) Shift Expectation Model

The above model, however, still assumes that once the typical individual perceives a wage structure, he anticipates that it will remain unchanged in the future. But under certain circumstances the wage structure can be objectively anticipated to shift in the future, and there are no reasons to believe that individual decision makers would not integrate this expectation in evaluating the benefit of education. Hence a third model may be developed by integrating the factor of expectation of future shift in wage structure. Under this model an eighteen-years old forms an expectation that the wage structure would shift in the future, and anticipates the benefit accordingly. A continued economic boom would form an expectation of economic growth in future, which would augment the anticipated anticipated wage differential. Also, such institutional arrangements as the Affirmative Action in the United States would foster an expectation of the shift of the wage structure for female, thus increasing the anticipated benefit of education.

As the model develops from the Classical Model to the Perception Bias and to the Shift Expectation Model, such subjective factors as the perception bias (lag) or the shift expectation was incorporated to the prevailing wage structure. Since those subjective factors are not directly observable, the model becomes increasingly difficult to be quantitatively defined and empirically investigated.

One important research method to bypass this difficulty is to ask individuals the perceived wage structure through a questionnaire survey. Recently, a number of significant studies have been made in this direction (Bowman 198[illegible]; McMahon and Wagner, 1978; Psacharopoulos 1981). Those studies proved to be powerful particularly in identifying the magnitude of the perception bias in general and its relation with the socio-economic backgrounds.

But questionnaire surveys are not applicable to the analysis of the changes in anticipated benefit over time, which is critical in the dynamic analysis of the changes in aggregate demand for education. Moreover, it is not clear how far the expectation of the future shift in wage structure is consciously conceived in one's mind, and reflects in the answers in the questionnaires. Although the educational choice is made individually, the shift expectation may be more the product of the "collective mind."

BEST COPY AVAILABLE

The seeming difficulty in linking the models to empirical analysis in fact reflects their theoretical problem: If the subjective factors are essentially arbitrarily determined, the models are not in fact able to provide any consistent explanation to the changes in the demand for education. In other words, by allowing for the subjective factors, the models appear to open the way to any ad hoc explanation.

But are the subjective factors truly arbitrarily determined? It does not appear to be too far-fetched to hypothesize that the perception lag follows a rule whereby it is systematically related with the actual wage structure observed in the past and present. One may also hypothesise that the expectation of future shift in wage structure is formed from the actual trend in the near past. Because of the assumed regularity in the relation between the changes in observable variables and the subjective factors, these hypotheses may be called the "rationality" hypothesis. The next section will show that by assuming rationality of expectation in this sense, the validity of the models of anticipated benefit of education can be tested empirically.

2. Empirical Analysis

In this section, the validity of the three models set forth in the previous section is tested through an empirical analysis of the changes in the demand for college education in postwar Japan. Because of the nature of this paper, full details of the theoretical and empirical contents are not reported here. Those readers who are interested in those points are referred to the original report (Kaneko, 1984).

Indices of Anticipated Benefit

For the empirical analysis, alternative sets of time-series indices of anticipated benefit of higher education were estimated from the statistics of wage structure and general wage levels in time-series. Benefit/Cost ratio (B/C ratio), rather than internal rate of return, was used in measuring the anticipated benefit for a theoretical reason related to the form of the aggregate demand function for college education. There are three sets of indices, the A, B and C indices, corresponding to the three models of anticiapted benefit.

The A index represents the Classical Model. Its value for a particular year was directly estimated as a benefit/cost ratio from the wage structure at the time. The time-series derived through this method therefore reflects the changes in current wage structure alone.

BEST COPY AVAILABLE

The B indices corresponds to the Perception Lag Model. The value of a typical B index for a particular year was estimated from the benefit/cost ratios at the present and past years with distributed lag wieghts. Since there is no information a priori about the characteristics of the lag pattern, ten alternative patterns of lag-weights, ranging from very short to long lag spans, were stipulated. The procedure thus yielded ten (from B-1 to B-10) indices, each in time-series.

The C indices represents the Shift-Expectation Model. The shift expectation is assumed to arise from the expectation on future productivity growth, which is formulated as a lagged function of the past economic growth rate. Two subtypes of indices were conceived: the C1 indices incorporate both the perception-bias and the shift expectation in a particular manner; and the C2 indices incorporate only the shift expectation. With the ten alternative patterns of lag-weights, this procedure yielded twenty time-series (C1-1 to C1-10, and C2-1 to C2-10) of anticipated benefit.

The Regression Model

A theoretical model of individual choice about education was developed and the aggregate demand function of education was derived therefrom. The theoretical analysis indicated that approximately the following relation hodls:

$$\frac{dE}{dt}\,\frac{1}{E\,(1-E)} = b_0 + b_1 R + b_2 Y + b_3 S,$$

where E is the enrollment rate; R, rate of change of the anticipated benefit of college education; Y, the rate of change of the average family income; and S, the change rate of the size of age cohort reaching the age of entering college. The expression at the left-hand side is called the "logit-change rate" of enrollment. From the theoretical analysis, it is expected that b_1 and b_2 have negative values, and b_3 a positive value.

The value of b's were estimated through an extensive regression analysis using time-series of E, Y, and S in combination of each of the alternative indices of anticipated benefit in place of R.

Results of the Regression Analysis

The regression analysis showed, in the first place, that the A index yields a negative regression coefficient, which is against our theoretical expectation. Thus the Classical Model lead to an apparent contradiction in explaining the changes in the demand for higher education.

From the results of the regression analysis involving the B, C1 and C2 indices, those with the highest multiple regression coefficients were selected and presented in

BEST COPY AVAILABLE

Table 1. The actual and predicted values of the logit change rate of enrollment are shown in Figure 1.

The I indices also fail to yield a positive regression coefficient on R, indicating that the indices estimated according to the Perception Lag Model is still inadequate in providing consistent explanations. On the other hand, the results involving C1 or C2 indices present positive coefficients on R. The regression coefficients on R carry decent magnitude of significance, and the coefficients on other variables assume the expected sign with some significance. Thus the Shift Expectation Model derives time series of anticipated benefit of higher education that provide consistent explanations on why the demand for education changed over time in postwar Japan.

The regression analysis thus demonstrated that in order to account for the changes in the demand for higher education in postwar Japan, the factor of growth expectation has to be taken into consideration.

3.Implication of the Analysis

The empirical analysis above dealt specifically with the changes in the demand for higher education in postwar Japan. The insights gained there, however, may have more general implications to the analysis of the demand for education. Specifically, the following three points appear to be significant.

First, the direct implication of the analysis is that, during a period of economic growth, the expectation for a contined growth in future would build up and that alone would augment the anticipated benefit of education, thus increasing the actual demand for education.

Hence, an economic cycle would affect the change in the demand for education through three factors: the change in family income levels, the change in wage structure, and the formation of future growth expectation. Since these three factors tend to have the same direction, all positive in an economic boom and all negative in a bust, an economic cycle would present a close correspondence with the changes in the demand for education in the long run. This explains why many industrialized countries experienced the "educational expansion" in the 1960s and the down-turn of the trend in the subsequent decades. It corresponded to the long-run economic cycle in the postwar world.

It should be noted, however, that the three factors do not necessarily have effect of the same direction. Depending upon the supply-demand relation in the labor market, the actual wage structure may change to reduce the wage differential even in a growing economy. But the expectation for future economic growth, and hence the general increase in wages may be still high. If the

BEST COPY AVAILABLE

positive effect of growth expectation is large enough to outweigh the negative effect of the change in wage structure, the demand for education would still grow. This seems to be what happend in Japan, and in some developing countries, where the demand for education kept growing even though the estimated rate of return was reportedly declining. Some analysts attributed the phenomenon to irrationality in educational choice or information bias, but our analysis showed that it can be explained consistently by taking shift expectation into consideration.

Second, although the above analysis focused mainly on the role of growth expectation in determining the change in aggregate demand in the long run, other types of shift expectation may become important under certain circumstances. The case in point is the demand of women for higher education in the 1970s. Both men's and women's colloge enrollment rates in the United States grew steadily in the 1950s and 1960s, corresponding to the long-run trend. In the 1970s, men's enrollment rate levelled off, but women's enrollment rate kept growing for some time. Particularly, the enrollment rate for the female of age 20-24 increased from 16 percent in 1960 to 22 percent in 1970.[1] But the rate of return of college education for women estimated from the wage statistics do not show any salient trend of increase for this period.[2] Obviously, there was a growing expectation that the wage structure for female workers would shift in future due to the institutional changes symbolized by the Affirmative Action.

Third, although the discussion so far stressed the significance of shift expectation in general, it should be remembered that its effect may become negligble under certain circumstances. In the period of slow economic growth, the expectation of future economic growth becomes small, making its effect on the anticipated benefit of education negligible. The actual demand for education would then reflect the changes in wage structure much more closely, thus presenting short-run fluctuations without a long-run trend. This appear to describe well the recent trends in the demand for higher education in Japan and in the United States.

BEST COPY AVAILABLE

Notes

[1] Estimated from: National Center of Educational Statistics, Digest of Education Statistics, 1983-83, Washington, D.C.: G.P.O, 1984, p.10.

[2] Estimated from: Department of Labor, Current Population Survey, Series P-60, various issues.

References

Bowman, Mary J. Education and Labor Markets in Japan. Chicago: The University of Chicago Press, 1983.

Craig, John. "The Expansion of Education," Review of Research in Education 9 (1981): 151-213.

Kaneko, Motohisa. "Educational Expansion in Postwar Japan: A Theoretical and Empirical Study." Unpublished Ph.D. Dissertation, The University of Chicago, 1984.

Psacharopoulos, George and Soumelis, C. "A Quantitative Analysis of the Demand for Higher Education," Higher Education 8 (1979): 157-177.

McMahon, Walter W., Wagner, A. P. "Expected Returns to Investment in Higher Education," Journal of Human Resources 14 (1981): 274-285.

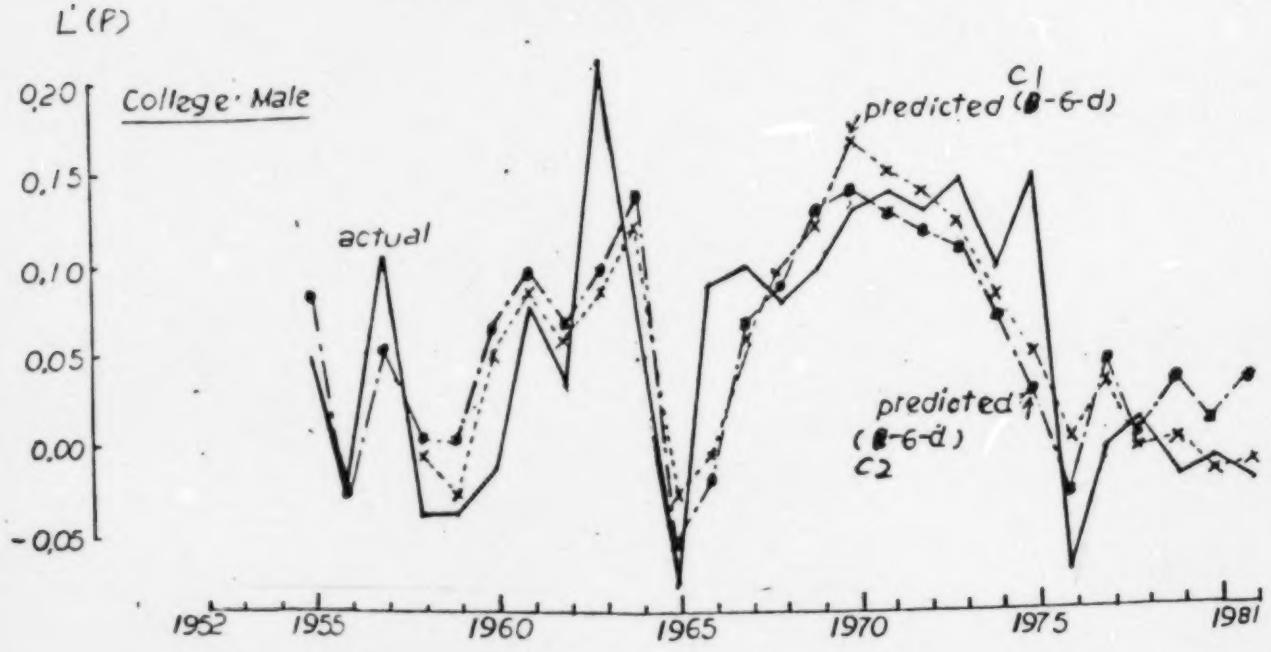
BEST COPY AVAILABLE

Table 1. **Selected Regression Results**

Index of R	Regression Coefficients: Con.	R	$.c_Y$	$.d_Y$	S	R	$\bar{R}^2$	F	D.W.
B-3	-0.051	-0.521*	2.073***		-0.343***	0.724	0.453	7.344 ***	1.915
	(0.035)	(0.273)	(0.703)		(0.101)				
B-3	-0.061*	-0.572**		2.250***	-0.368***	0.761	0.517	9.196 ***	2.133
	(0.033)	(0.258)		(0.637)	(0.095)				
C1-7	-0.015	0.055	1.661**		-0.317***	0.684	0.399	6.761 ***	1.923
	(0.032)	(0.035)	(0.655)		(0.100)				
C1-6	-0.009	0.073*		1.525**	-0.324***	0.705	0.432	7.583 ***	1.915
	(0.028)	(0.038)		(0.557)	(0.094)				
C2-6	0.032	0.209**	0.737		-0.240**	0.752	0.501	8.695 ***	2.168
	(0.039)	(0.086)	(0.818)		(0.101)				
C2-6	0.019	0.190**		1.007	-0.257**	0.765	0.522	9.386 ***	2.174
	(0.037)	(0.083)		(0.762)	(0.100)				

Note: Standard error in parenthesis. *** indicates significantly from 0 at 1 percent level; ** at 5 percent; * at 10 percent.
The numbers of observations are 24 (1958-81) for equations with the A and C indices; 27 (1955-81) for those with the B indices.

Figure 1. Actual and Predicted Values of the Dependent Variable



BEST COPY AVAILABLE